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ABSTRACT

This paper presents a critique on the use of video tape recordings in observing human behavior for instructional and therapeutic purposes. Two problems are discussed in relation to this issue: video tape may distort the way a subject acts during recording: and the techniques, film conventions, and camera angles may be such that they give the best view of one person. Both of these factors may produce an unrealistic picture of the person being taped; in effect, the recording mechanism controls the action recorded. Persons using video tape in self-confrontation exercises would be able to successfully manipulate the results of the observation. Any research which aims at replicating "real life" in order to guarantee external validity must deal with these issues. (RB)

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VIDEOTAPE AS AN OBSERVATIONAL TECHNIQUE: A CRITIQUE

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VIDEOTAPE AS AN OBSERVATIONAL TECHNIQUE:
A CRITIQUE

The utilization of videotape as an observational technique is being advocated with increasing fervor by practitioners and researchers in several different areas.[1] With few exceptions (Birdwhistell, 1970 and Michaelis, 1955) most of these advocates have not considered the limitations and problems inherent in videotape which might work to confound research outcomes. As Michaelis indicates,

> "A major use of scientific cinematography in anthropology, psychology, and psychiatry is the recording of data under conditions of observation, as distinct from experimentation. In order to make fullest use of such human research and record films it is essential for the scientists to be fully conversant with sources of error and limitations in the making of these films and also with the conventions developed around the human figure by the commercial cinema; this is particularly so under the less rigidly controlled conditions of field work...equally important is the need for familiarity with the basic and the advanced cinematographic techniques."[2]

It will be the focus of this paper to consider these "sources of error" and to discuss their potential impact upon research.

Issues to be Discussed in Review of Videotape as an Observational Technique

Should the Camera be Concealed?

This issue is essentially non-unique to videotape since the same problem must be considered when using human observers. The impact of being observed and recorded by a mechanical object, however, may have some unknown effects upon the subjects. Whether a researcher chooses to conceal or not is dependent upon two related items: 1) The age of the subjects, and more critically, 2) The type of research problem. First, the consensus of opinion among persons utilizing videotape is that younger subjects are not significantly effected by the presence of the camera. This point of view is reflected in primarily intuitive

judgments such as, "It should be borne in mind that the degree of concealment necessary will depend on the subject; little if any, will be required for infants and children..."[3] Secondly, whether or not to conceal depends upon the use one makes of videotape. If the object of the procedure is to make an accurate recording from which to confront the subject and attempt to change behavior then one must consider whether the non-concealed camera reveals a distorted view of that subject.[4] In the case of normal adults, filming may be carried out differently depending totally upon what or how the recording will be utilized. Alger and Hogan argue that for therapy situations they deliberately fail to conceal the camera because it produced an atmosphere of openness which is consistent with therapeutic goals.[5]

Does Videotape Control the Message Recorded?

There are two questions which will be discussed in relation to this issue: 1) videotape may distort the way a subject acts during recording, and 2) the techniques, film conventions, may be such that they give the best view of a person. Both of these items may work to produce an unrealistic picture of the person being taped. In effect, the recording mechanism controls the action recorded. Persons utilizing videotape in self-confrontation exercises would be able to successfully manipulate these factors in a way which is beneficial to their patients, but given a situation where the camera is supposed to unobtrusively record action these issues are potentially harmful. Any research which aims at replicating "real life" in order to guarantee external validity must reckon with these issues.

Research aimed at describing non-verbal behavior is directly effected because the "demand characteristics" of videotape may very well mandate what behaviors are exhibited by the subjects.[6] Jury research usually utilizes videotape to manipulate variables via a recording of a trial situation. One such variable is attorney credibility.[7] Film conventions developed in conjunction with techniques of illumination and camera angle could very easily confound the effect of the credibility manipulations used. An angle which makes one attorney appear taller than another can introduce a confounding variable, i.e. physical attractiveness,[8] which would obscure the credibility manipulation.

We need research which will tell us the impact of videotape in studies of this nature, but until this is done we need to become aware of these issues and make attempts to control for them. Accomplishments toward this end have been largely of an anecdotal nature. Alger and Hogan rely exclusively upon subject self-reports of the impact of the camera.[9] This type of intuitive judgment is susceptible to many pitfalls, of which the most common are: 1) the experimenter (therapist) bias toward wanting their method to work, and 2) the desire of the subject (in this case, patient) to please the experimenter (therapist) and support their view toward videotape plus the patient's desire to exhibit improvement after a series of sessions.

Who Should Operate the Camera?

Potentially there are three answers to this question: 1) the experimenter, 2) the subject, and 3) a third party. Allowing the experimenter, or his replacement, to operate the camera may be both an

advantage and disadvantage. In some studies the observations which are being made could be made more relevant to the research question by having the experimenter do the recording. This would allow the experimenter to focus exactly upon what he deemed necessary for the research. The obvious drawback is that the experimenter, as cameraman, would selectively gather only that information which supports the research question. This introduces the problem of the "experimenter interacting with his experiment."[10]

Once again this question must be resolved with primary consideration given to the type of research being done. The self-confrontation literature vividly demonstrates both alternatives. Some users want an accurate videotape from which behavior can be modified; others choose to manipulate the recording in such a way as to promote the type of behavior desired. Jury research is also plagued with this question because if the researcher operates the camera then there is the possibility that he might focus upon the arguments or the items designed to operationalize variables which would correspond more closely with a trial by "one" rather than a trial by six or twelve peers.[11]

The second alternative is to have the subjects operate the camera. This particular method has interesting potentialities for small group research. By asking each subject to film portions of the group interaction one might be able to closely approximate a record of what the group members perceived as being relevant behavior. This would allow researchers to both describe the group in new ways but also they could more clearly perceive the group members frame of reference.

Alger and Hogan relate that,

> "At times, members of the family have been asked to operate the camera. This often produced a dual result. First, the family mamber may reveal a great deal about his own feelings in the way he chooses his scenes. Second, he tends to develop a different perspective on the total situation when he is in place behind the camera. Several patients have commented that they realized after the experience of operating the camera that they had found a new perspective in the way they were looking at any situation in which they were later involved."[12]

Whether to use this alternative is again determined by the purpose for which the videotape is being made.

Another alternative is to have a third party do the recording. By placing a naive party behind the camera this would partially eliminate the bias of the experimenter discussed earlier, but you might end up recording a great deal of unproductive trivia due to the perceptual idiosyncrasies of the third party. Interestingly, most field studies utilize either the first or third option, except when a naive party is used, steps are usually taken to inform him as to what information is to be recorded.[13] This, however, reintroduces the interaction of the experimenter with his experiment.

What is the Impact of Videotape on the Viewer-Researcher? Evaluator?

It is a common experience that when playback is used to help someone learn new maneuvers in sports, for example, that there is a gradual lessening of the effect after two or three weeks of daily exposure. In other words, the viewer tends to become used to his image in that situation, and so the freshness of the observer-role is diminished. "...one, in a sense, becomes functionally 'blind' to one's own image."[14] This becomes an extremely critical issue simply because it is usually overlooked. In order to overcome

this problem in viewing research tapes, it is advisable to follow a closely prescribed systematic method of viewing the tapes. As Birdwhistell observes, "No mechanical contrivance, however elaborate and precise, can be more than a supplement to the trained observer; the camera cannot substitute for the untrained eye."[15]

Can Videotape Detect Situational Variables Effecting Communicative Behavior?

Much has been written about studying behavior change across situations. Communication theorists are currently urging that studies must consider situations as a major variable determining the nature of communicative interactions. Videotape is viewed by many as a cure all for gathering complex data, across situations for analysis at a later time. Alger and Hogan offer their view when they write,

> "Therapy with natural groups, such as families and couples, is evidence of growing acceptance of the concept that no individual can be understood in isolation. The videorecording is a superb technique for capturing the context of a situation as well as the multiplicity of cueing and other communicational behavior... The videorecording makes it possibl for those involved in a situation to suddenly stand back and observe themselves in the midst of an interactional situation."[16]

It is of utmost importance that researchers realize that the eye of a camera can produce a situation in and of itself. Both the pressure on the subject to perform for the camera and the intensity and narrowness of focus of the camera on the material are issues which can seriously alter research findings. All of the issues considered in this paper must be reckoned with when utilizing videotape for this purpose. It is necessary also to consider the traditional methodological questions of validity and reliability in research of this type.

Does Current Videotape Research Provide Answers to Methodological Questions Concerning its Utilization?

Much of the study associated with the utilization of videotape is anecdotal and that research which does attempt empirical clarification is inconclusive. The following statement bears wittness to the anecdotal nature noted,

> "Since 1965 the authors have used the videotape playback technique with over 75 families and marital couples in their private practices. On the basis of this experience, it is felt that the addition of this tool for providing immediate self-confrontation has made a significant contribution to therapy. Not only does it make immediately available more objective data concerning the therapeutic process, but it also encourages a more intensive emotional involvement in the process of therapy itself. In addition, the nature of the therapeutic endeavor is felt as a more equal and cooperative activity, since both patients and therapists have equal access to the objective record of what transpired."[17]

To many interested bystanders this statement is extremely compelling as well it should be and evidence such as this is quite prevalent in the videotape literature but it is misleading in rather significant ways. The objectivity of the videorecorder is a definite problem and will be discussed, but the need for controlled research is mandated by the fact that the videotape is being used in ways which are potentially harmful, as well as, misleading to the would be researcher. Tentative research obviates the necessity to study the side effects of videotape as indicated by Roberts when he concludes,

> "Equally tenable, however, is the proposition that videotape playback can facilitate the lowering of self-esteem when the self-picture is markedly distorted in a positive direction. Though the later example is probably infrequently the case, the important point is that videotape playback functions as a kind of 'debilitating' agent causing the individual to reassess his self-image in terms of an 'objective' referent..."[18]

A middle position is probably the safest. After an extensive review of the self-confrontation literature, Fuller and Manning suggest that,

> "Video-playback may be resolving practitioners' most pressing problems--motivating client students for treatment and putting responsibility for learning into the learner's own hands. In addition, their populations have characteristics which make them ideal subjects for this treatment...On the other hand, the cautions of empiricists are certainly warranted. They see a powerful tool, whose nature and effects are little understood, cutting a wide swath and perhaps destroying the wheat with the chaff."[19]

Are the Methodological Reports Associated with Videotape Research Adequate?

The answer to this question is a rather emphatic, no. A negative response is mandated by the fact that the bulk of research accomplished utilizing videotape does not tell us how the tapes were assembled. It is absolutely essential that any study using videotape insert a detailed description of how that tape was assembled and uses. Some argue that all studies utilizing videotape should provide indications of the length of time taken to compile the tape (this gives an idea as to how much editing occured, etc.) plus an indication of the cinematographic techniques used such as lighting, camera angles, lenses and operator. If this detailed description is included in research reports then, "...it will immediately enhance its value, as it will thus become possible for each viewer to be aware of the personal interpretation given by the cinematographer to each scene, a precaution which has so far been completely neglected."[20] Without such information, the reader is deprived of the information necessary to evaluate the method and results of the study as well as to replicate it -- a hallmark of science.

An example of where future research would have been aided by past research, had this description been included, can be found in Anapol's jury research. In this research the variable of attorney credibility was studied to determine its impact upon the outcome of a trial. His credibility manipulation involved varying: 1) the prestige of the law school attended, 2) the experience of the attorney, and 3) membership in a prestigious firm. It is difficult to determine whether his credibility manipulation was successful because we do not know the method of videorecording used and the credibility manipulation could easily have been obscured by the video techniques such as camera angle and illumination. This problem is enhanced when you are using a cinematographer unfamiliar with the credibility manipulation or one familiar with the manipulation. (Recall the discussion as to who operates the camera). The generalizability of the results are also suspect due to several other cinematographic conventions which in all probability were a part of the videotape. A common but erroneous assumption is voiced by Anapol in the discussion of his research when he writes,

> "...important channels of communication are lost when the visual and/or audio aspects of the trial are eliminated...for these reasons this study is designed to duplicate as closely as possible the real trial situation and thus insure a reasonable measure of ecological validity...We can conclude that this report should be viewed as a field study rather than as a controlled experiment. We do feel that it has demonstrated the feasibility of maintaining ecological validity in a study of trial and jury variables."[21]

Statements such as this indicate a lack of concern as to the potential distortions inherent in videotape (i.e., intensity of focus, etc.). It is inaccurate to assume ecological validity and call a loosely controlled experiment a "field study". It is essential to realize that these

problems could be partially removed by carefully constructing a videotape plus offering a description of the method of construction.

Is Videotape Objective?

A rather definitive answer to this question is given by Michaelis when he suggests,

> "The moment the cinematographer sets up a camera in the laboratory or in the field, selects a scene in the viewfinder, and presses the starter button, his whole personality has been brought into play, and a theoretically objective technique has has changed into a subjective statement."[22]

Obviously, the same problems that a human observer must confront in guarding against selective perception also apply to the cinematographer. As mentioned earlier, a systematic method accompanied by a detailed description of that method must be a part of any videotape research. In addition to human error, we must also consider the perceptual distortions fostered by cinematographic conventions. Michaelis offers an explanation of this phenomena in writing,

> "...there is no social scientist today who has not, at least on some occasions, seen commercially produced feature films. These visits to the cinema have conditioned his mind, although subconsiously, to an approach to the human figure on the screen which will be the same whether the color of the skin is white, black, brown, yellow, or red. During the course of the first 50 years of existence, the film has, like any other recording medium, developed its own set of conventions, and these must be carefully considered in any research film which deals with human subjects. The ignorance or neglect of these conventions may not necessarily lead to an objectively wrong photographic image on the emulsion of the film, but it may easily by virtue of some limitations of the cinematographic medium of by their final arrangement, lead to the formation of a subjective impression in the mind of the observer in the audience that can be far removed from the true state of affairs. In fact, the film can and does lie."[23]

By having several different persons review a tape both before and after editing one can minimize any subjective bias which might be part of the material recorded. If the purpose of the recording is to manipulate certain variables a careful review by colleagues in the field would help to assure that the manipulations are free from such bias. Film conventions can also be used to an advantage in self-confrontation research because the projected image can be varied with a significant degree of intensity of focus upon desired behaviors.[24] In short, an awareness of the cinematographic conventions is necessary to legitimately utilize videotape as a research technique.

What Cinematographic Conventions Need to be Considered?

Editing

Investigators must frequently transform several reels of raw material into an acceptable preview of what is being studied. To do this necessitates the removal of extraneous, irrelevant material. Realize at this point that editing can and usually does change the image created by the original recordings. Recently, a method termed Visual Information Display and Retrieval system (VID-R) was designed to help reduce this problem along with eliminating some of the burden of sifting through lengthy reels of tape.[25] To avoid the intricacies of editing one might consider using the whole tape but this is often impossible since, "editing the material will be essential before it can be employed for any scientific evaluation or for presentation as research evidence."[26] To successfuly edit it is essential that detailed written records be kept as to what, how and why the original shot was taken in order to avoid information loss in editing. For a more detailed description of editing procedures, one can consult technical texts on the subject.

Film Speed

Everyone at one time or another has witnessed the utilization of slow-motion film. This technique can be extremely useful for effectively separating behavioral sequences. Its counterpart, high-speed cinematography assists in the location of and increased clarification of behaviors which occur faster than the human eye can see. Both of these techniques can be quite useful but again it must be understood by the viewers, especially those chosen as subjects in a study, that the speed of the film is other than normal. Slow or fast film techniques can produce impressions of their own that can be confused with the behaviors in question. The form and movement of the subject, as well as, the motion of the camera can produce subjective impressions in viewers which distort reality and invalidate the scientific accuracy of the research film.[27]

Visual Observation in Relationship to Cinematographic Recording

The narrow angle of vision of the camera lens, as compared with the human eye, has an important influence on the cinematographic recording of any event. It immediately focuses the attention on a smaller field of vision (human vision encompasses 120 degrees and camera vision is between 5 and 50 degrees with an average of 25 degrees), and as long as the camera position remains unchanged, the viewer has to observe the same scene from the same point of view, but with a far more concentrated attention than would be possible in the field. This can be an outstanding advantage, as all irrelevant matter has been excluded, and the minutiae of the event can be fully analyzed from such a film. However, this "irrelevant" matter that is excluded is precisely what the social scientist himself usually ignores or considers as irrelevant. The greater the specificity of the image, the more it has been selected by

him and will influence the audience to see the section from his point of view instead of forming an irdependent judgment.[28] It is critical to note the impact of this videotape fact of life upon studies in communication. If you were attempting a situational analysis of communicative variables the situation would have to be maintained within a 21 to 25 degree space. (The average width of the lenses.) For example, research in jury behavior has reached two conclusions using a videotape of a trial as the stimulus object: 1) that six man juries make speedier decisions and, 2) that notetaking assists in the recall of facts.[29] Both of these conclusions could be dramatically effected by the narrow and therefore intense focus of videotape upon the trial situation. It is common knowledge that the majority of a real jury's time is spent on factual recall during deliberation, therefore, if the tight focus of the videotape highlighted in any way, these facts, this would invalidate the comparison between the experimental and real jury. If this comparison was avoided this would eliminate some of the problem, but then the problem would be the ability to generalize beyond this study. If nothing else this factor would tend to obliterate any generalizability to actual trial situations. Recall also that ecological validity was a primary concern and claim of the jury researchers. This type of research demonstrates the need to discover the impact of videotape in relation to such variables. It might be feasible to arrange to have a group of subjects watch a trial, or perhaps a mute court trial and another group watch a videotape of the same trial to determine the differences in speed of decision or factual recall. Archival data might even be used since the length of jury deliberations are already a matter of record. At a minimum researchers should note the possible side-effects

of videotape in their reports. Realize, however, that depending upon the purpose of the research the above disadvantages can be turned into advantages given another type of research question. The ability to focus upon specific interactions can be quite helpful. When a wideangled lens is used, one can observe the interrelatedness of each participants behavior. According to Alger and Hogan, "This is especially valuable in determining family interactions and in highlighting established family patterns."[30] A zoom lens is valuable for focusing on a person' facial expression, and such a picture often has a great impact. Special effects can be obtained through the use of generators, allowing the use of split-screen images. In this way, two people confronting each other can be placed side by side on the viewing screen.[30]

The Effect of Camera Angles

A totally inaccurate subjective impression of the importance of persons being recorded can be produced via simple and occasionally unconscious manipulation of the angles of the camera. Anapol's jury research which asked the subjects to pick the attorney that they would employ (credibility variable) could be easily distorted via camera angles. By producing a shot which exaggerated the height of one attorney, this alone could produce a mind set which could explain why one attorney was selected over another.[31] In situations like this the cinematographer should attempt to find a neutral angle. As Michaelis indicates, "The only neutral, and hence scientifically accurate, position

is the one where the lens of the camera is at the same height above the ground as the center of attention in the picture itself, thereby limiting the position of the observer himself."[32]

Illumination

Illumination, in much the same way as camera angle, can be manipulated to produce confounding results. Anyone who has seen a commercially produced film can understand how this variable takes effect. The film-maker can use lighting to gain the desired impression, the emotional mood, or a dramatic effect. Generally, a brightly lit scene will produce a pleasant and cheerful atmosphere, while dimly lit scenes are suggestive of gloom, poverty and danger. Michaelis explains that,

> "For accurate scientific recording, this convention of illumination should be borne in mind wherever possible, particularly in the laboratory, but it may be difficult to do so in the field... with the sun as the only source of illumination it may often be desirable to employ reflectors to lighten any deep shadows or excessive key lights."[33]

Obviously, a videotape reproduction of a trial situation could be done in such a way as to totally distort the view of that trial. Bright lights on the defense attorney and a shadowy shot of the prosecutor could even make Richard Nixon appear innocent.

Fortunately, research is being done in this area. Tannebaum and Fosdick manipulated lighting angles and discovered that viewers perceptions of models were evaluated differently given different angles of illumination. They reported that, "There is a significant difference between lighting angles only on the evaluative factor. Although the difference on activity and potency are fairly substantial, they fail to meet the criterion of statistical significance."[34]

Conclusions

After reviewing a partial sample of research projects using videotape (specifically in the areas of law and communications and self-confrontation) and submitting those studies to a series of methodological questions concerning the use of videotape; several conclusions can be drawn:

1) We need as much research about our methods as with our methods.

2) An observational technique as valuable as videotape appears to be, must be investigated as to its methodological soundness. The more we know about our methods the freer our research will be from confounding variables produced by those methods of observation.

3) Methods cannot be tested in a vacuum. Research must be done in a particular subject area so that the relationship between the method and subject matter can be discovered. This is critical since the applicability of videotape to varying research questions must be answered given the conceptualization of what the research is designed to accomplish.

4) Simple awareness of variables effecting the production of a videotape can do much to eradicate intervening cinematographic variables.

[1]Ray L. Birdwhistell, Kinesics and Context (University of Pennsylvania Press: Philadelphia, 1970). Ian Alger and Peter Hogan, "Enduring Effects of Videotape Playback Experience on Family and Marital Relationships," American Journal of Orthopsychiatry, Vol. 39, 1, January, 1969, pp. 86-94. James J. Owder, "Personal Change Through Self-Confrontation," Educational Broadcasting Review, Vol. 4, August, 1970, pp. 23-24. Malthon M. Anapol, "Behind Locked Doors: An Investigation of Certain Trial and Jury Variables by Means of a Videotaped Trial," paper presented at the 59th Annual Speech Communication Association Convention, New York, New York, November 8-11, 1973, p. 3, and Joel Lawrence Effrein, Videotape Production and Communication Techniques, (Blue Ridge Summit, Pa.: Tab Books, 1971).

[2]Anthony P. Michaelis, Research Films in Biology, Anthropology, Psychology, and Medicine (Academic Press Inc., Publishers: New Yor, 1955), p. 167.

[3]Michaelis, p. 185.

[4]Frances F. Fuller and Brad A. Manning, "Self-Confrontation Reviewed: A Conceptualization for Video Playback in Teacher Education," Review of Educational Research, Vol. 43, 4, Fall, 1973, pp. 469-528.

[5]Alger and Hogan, p. 88.

[6]Birdwhistell, p. 56.

[7]Anapol, p. 4.

[8]Richard A. Kulka and Joan B. Kessler, "Is Justice Really Blind?--The Influence of Physical Attractiveness on Decisions of Simulated Jurors," paper presented at the 59th Annual Speech Communication Association Convention, New York, New York, November 8-11, 1973.

[9]Alger and Hogan, p. 93.

[10]Donald T. Campbell and Julian C. Stanley, Experimental and Quasi Experimental Designs for Research, (Rand McNally, Company: Chicago, Ill., 1963), p. 20.

[11]Kulka and Kessler, p. 8; Anapol, p. 4.

[12]Alger and Hogan, p. 88.

[13]Michaelis, p. 179.

[14]Alger and Hogan, p. 89.

[15]Birdwhistell, p. 50.

[16]Alger and Hogan, p. 87.

[17]Alger and Hogan, p. 93.

[18]Churchill Roberts, "The Effects of Self-Confrontation, Role Playing, and Response Feedback on the Level of Self-Esteem," The Speech Teacher, Vol. 21, 1, January, 1972, p. 25.

[19]Fuller and Manning, p. 511.

[20]Michaelis, p. 168.

[21]Anapol, p. 15.

[22]Michaelis, p. 167.

[23]Michaelis, p. 168.

[24]Fuller and Manning, p. 501.

[25]Paul Ekman and Wallace V. Friesen, "A Tool for the Analysis of Motion Picture Film or Videotape," American Psychologist, Vol. 24, 1969, p. 240-243.

[26]Michaelis, p. 181.

[27]Michaelis, p. 176.

[28]Michaelis , p. 172.

[29]Anapol, p. 15.

[30]Alger and Hogan, p. 89.

[31]Anapol, p. 11.

[32]Michaelis, p. 177.

[33]Michaelis, pp. 178-179.

[34]Percy H. Tannenbaum and James A. Fosdick, "The Effect of Lighting Angle on the Judgment of Photographed Subjects," A.V. Communication Review, Vol. 8, 1960, p. 258.